Overview of NAPL and Groundwater Programs

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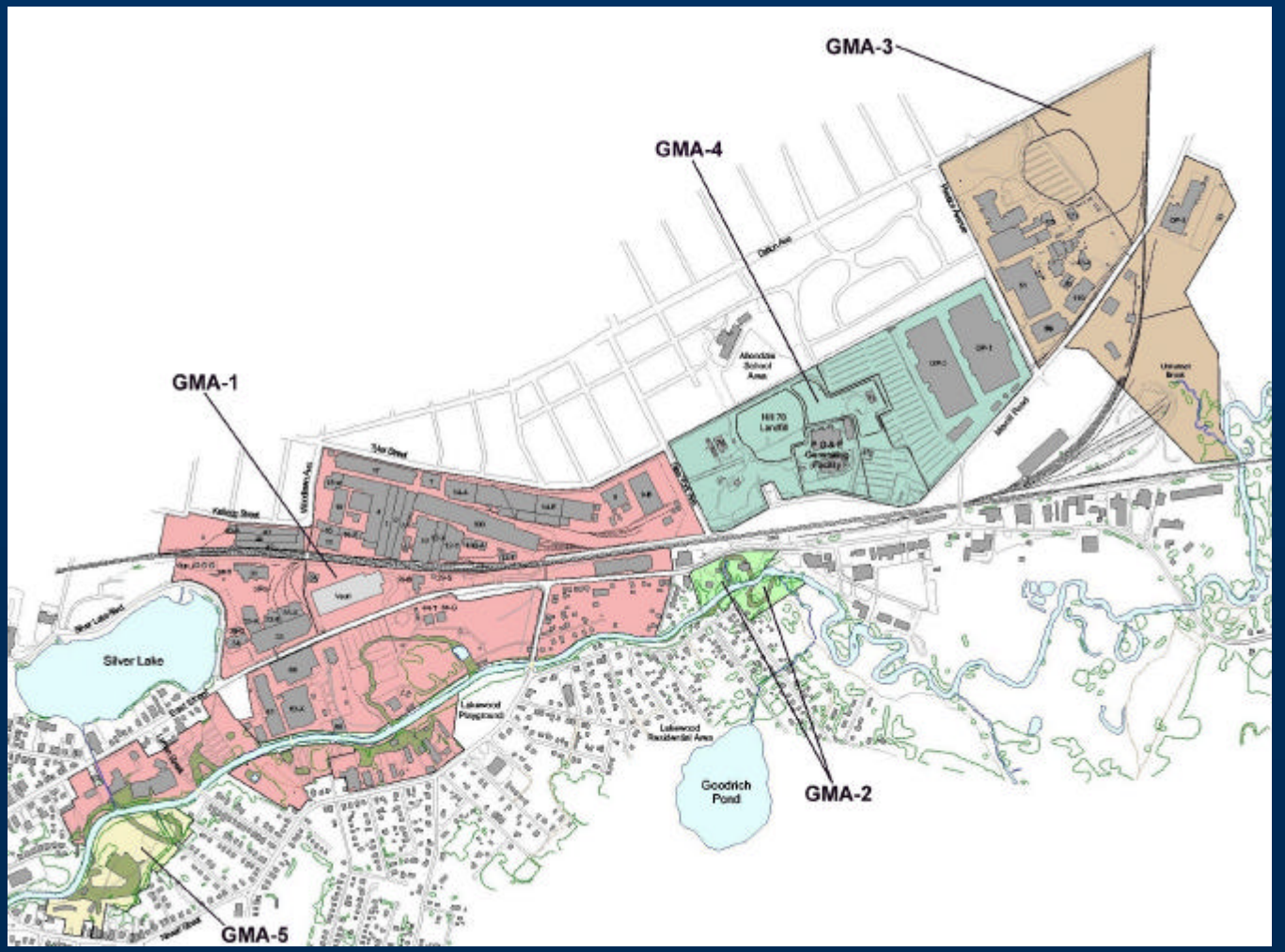
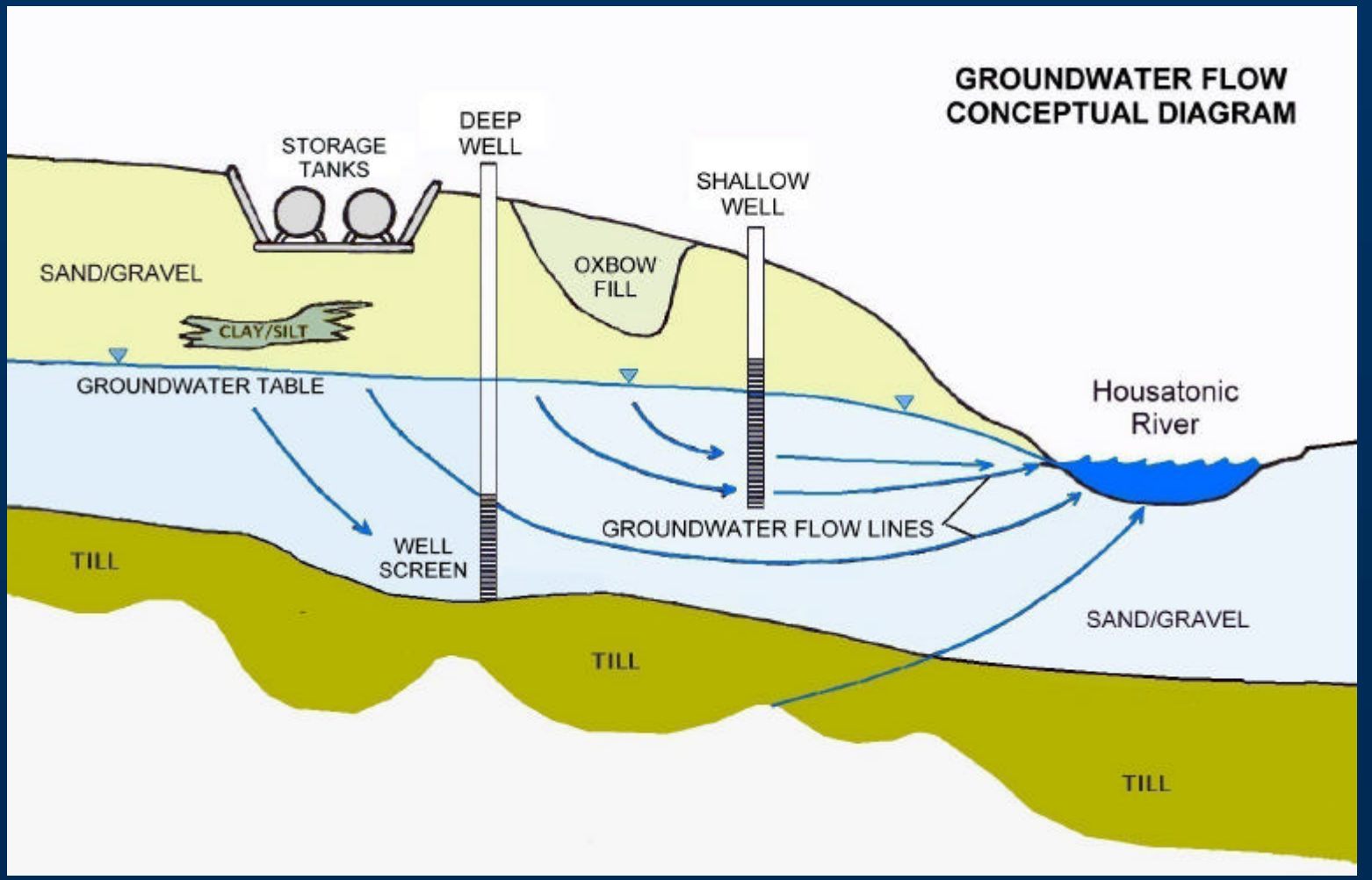
EPA New England

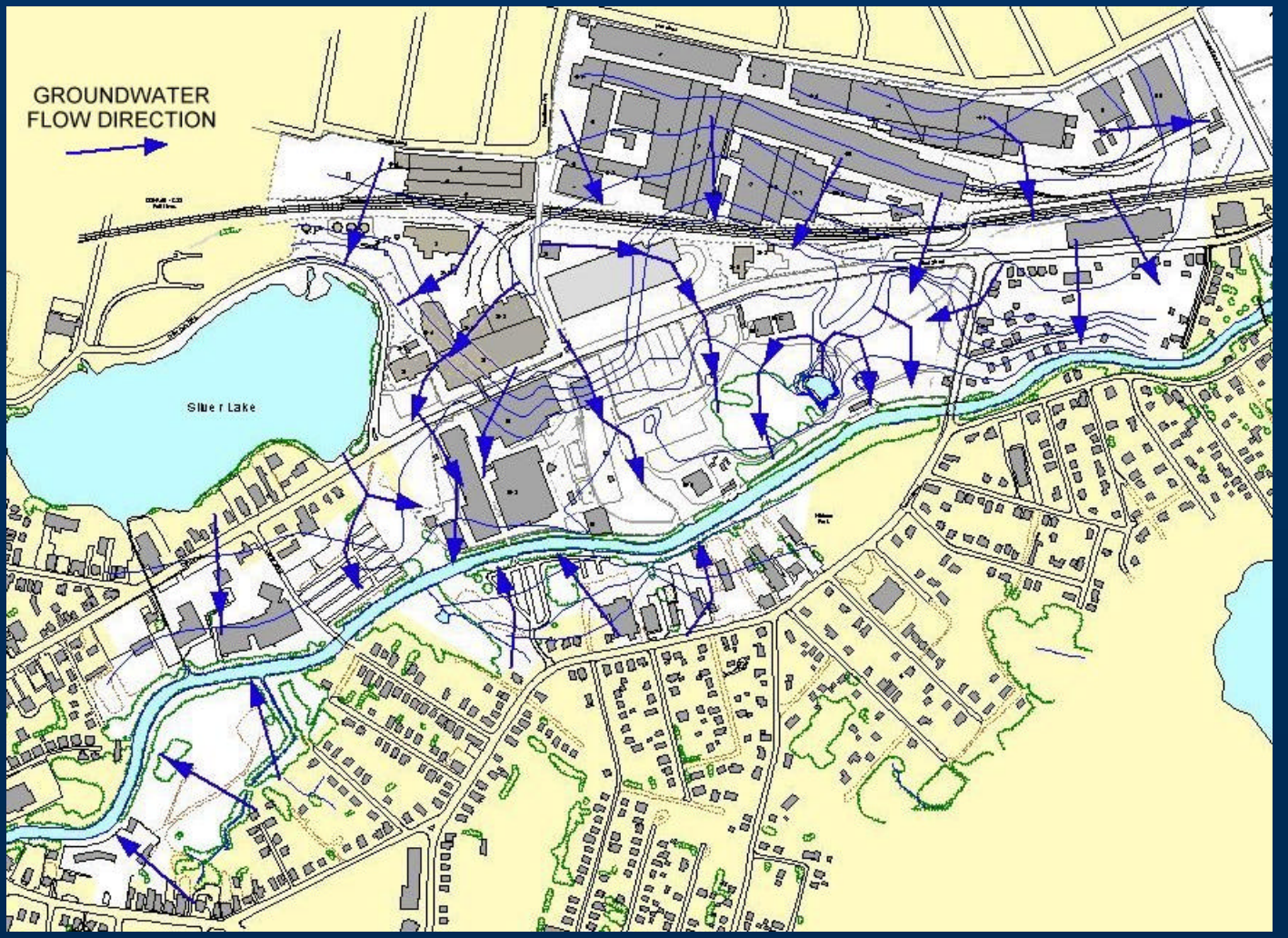
Groundwater Management Area (GMA) Map



Generalized Groundwater Flow Diagram



Generalized Groundwater Flow Map for GMA-1



Non-Aqueous Phase Liquids (NAPLs)

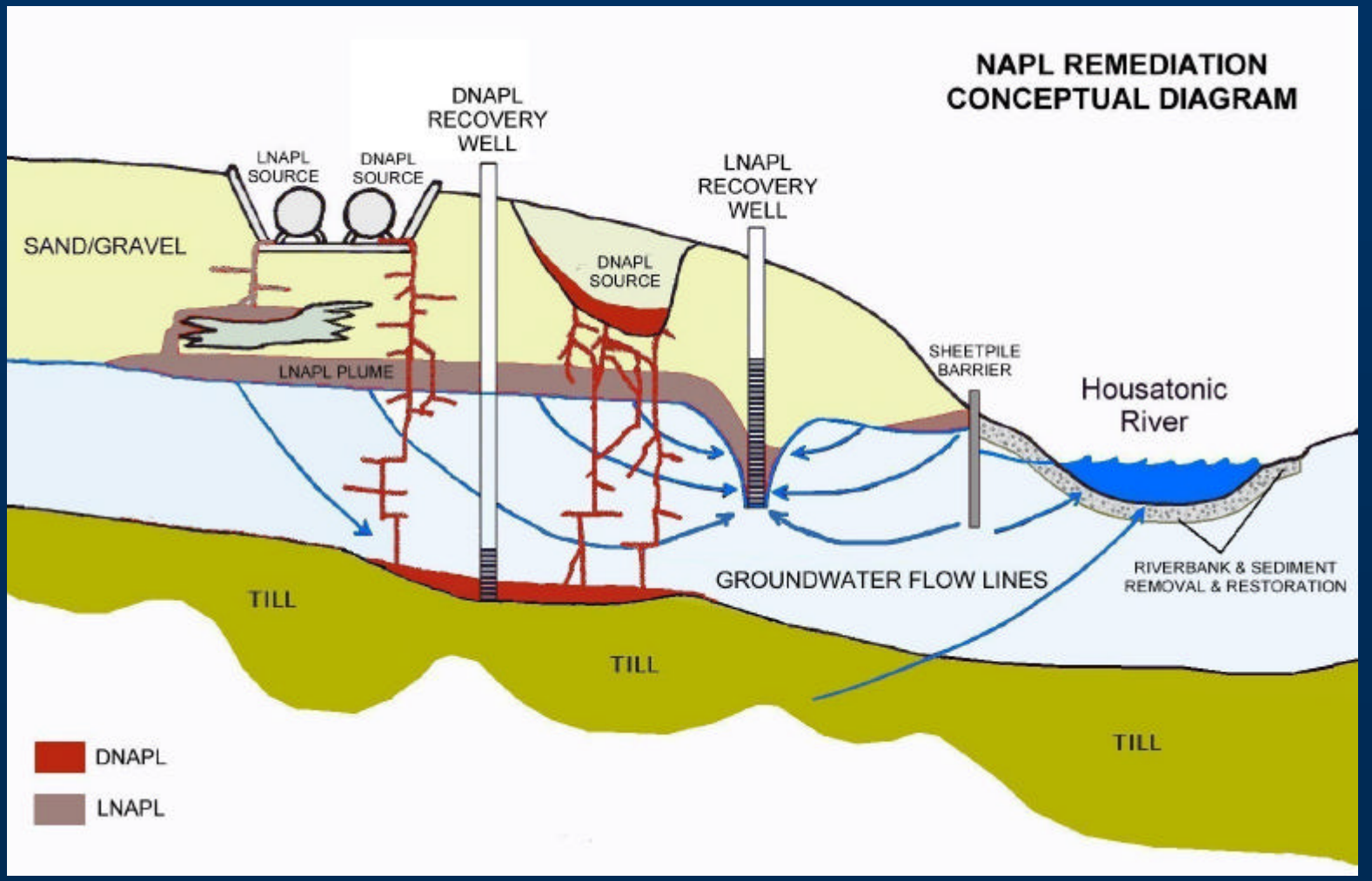
- Definition: Hydrocarbon Liquids (Commonly Called Oils) That Do Not Readily Mix With or Dissolve in Water (Non-Aqueous).

- Dense NAPLs (DNAPLs) Tend to Sink in Water.
- Light NAPLs (LNAPLs) Tend to Float on Water.

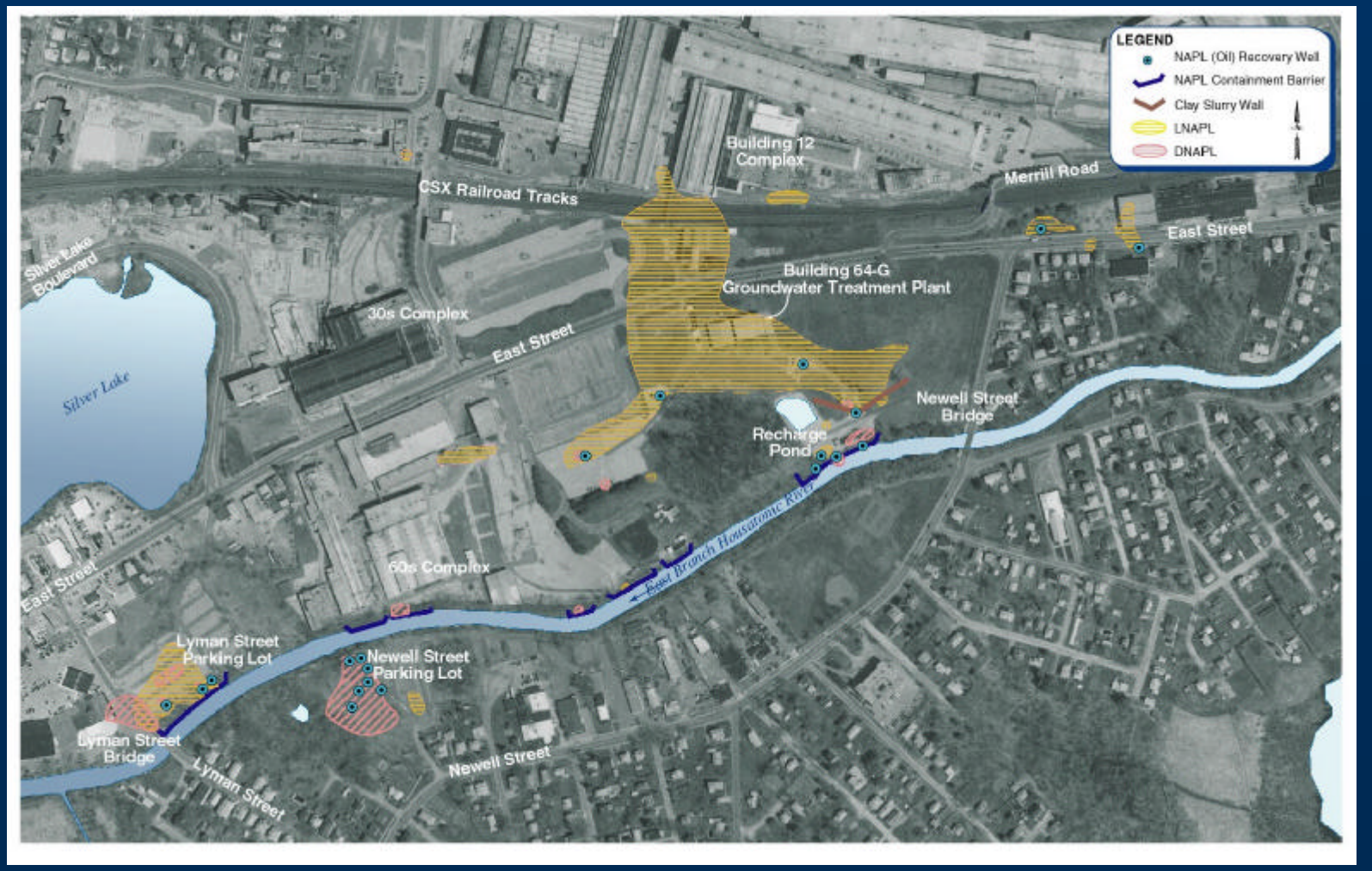
NAPLs at the GE - Housatonic River Site

- Pyranol: Mixture of PCBs (Aroclors 1254 or 1260) with Trichlorobenzene. Acts as a DNAPL.
- Aroclor 1260: PCB oil. Acts as a DNAPL.
- 10C Insulating Oil: Petroleum distillate (mineral oil). Acts as an LNAPL.
- Coal Tar: Manufactured Gas Plant sludge and liquids. Acts as an LNAPL or DNAPL.

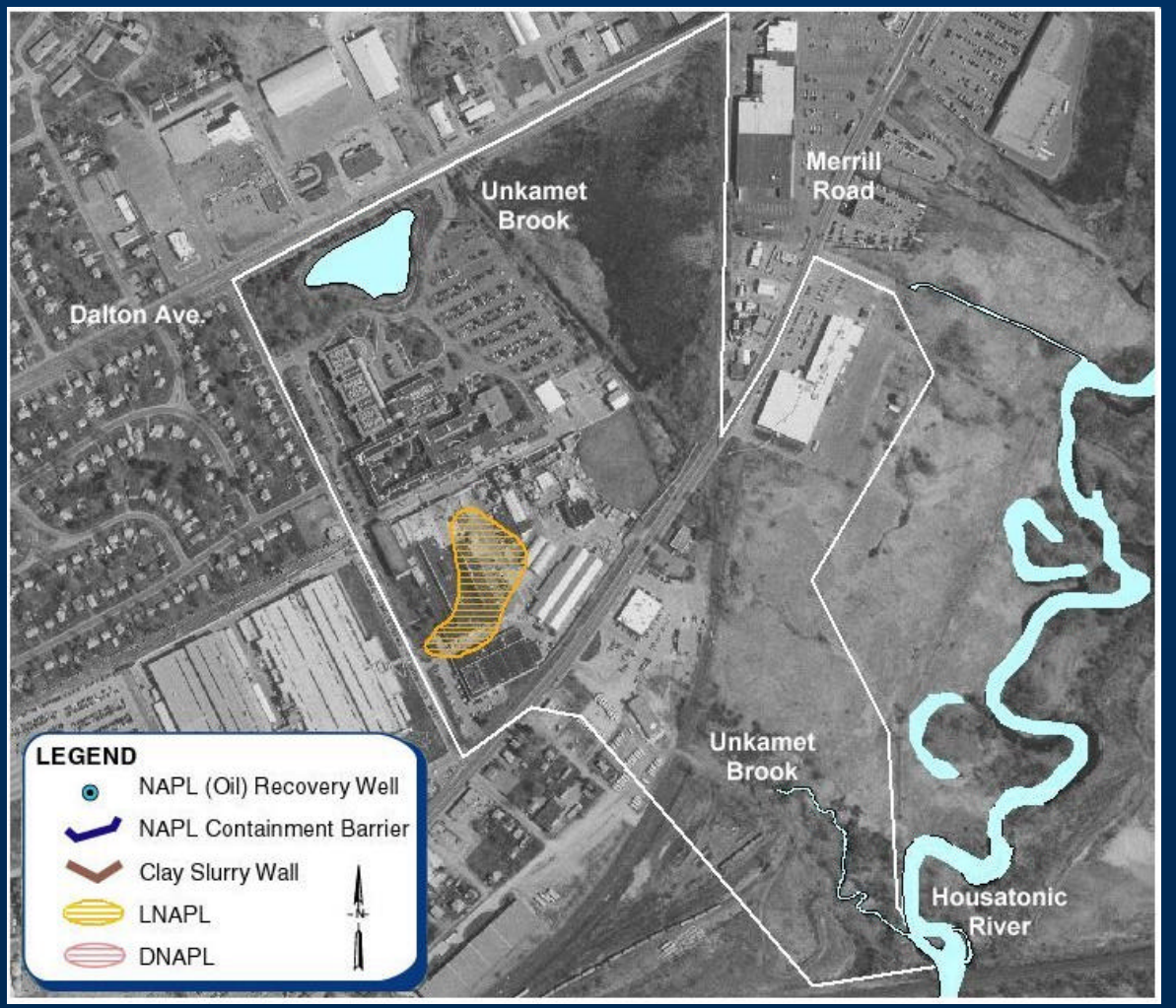
NAPL Conceptual Diagram



Approximate Extent of LNAPL & DNAPL – Spring 2001



Approximate Extent of LNAPL at Unkamet Brook Area

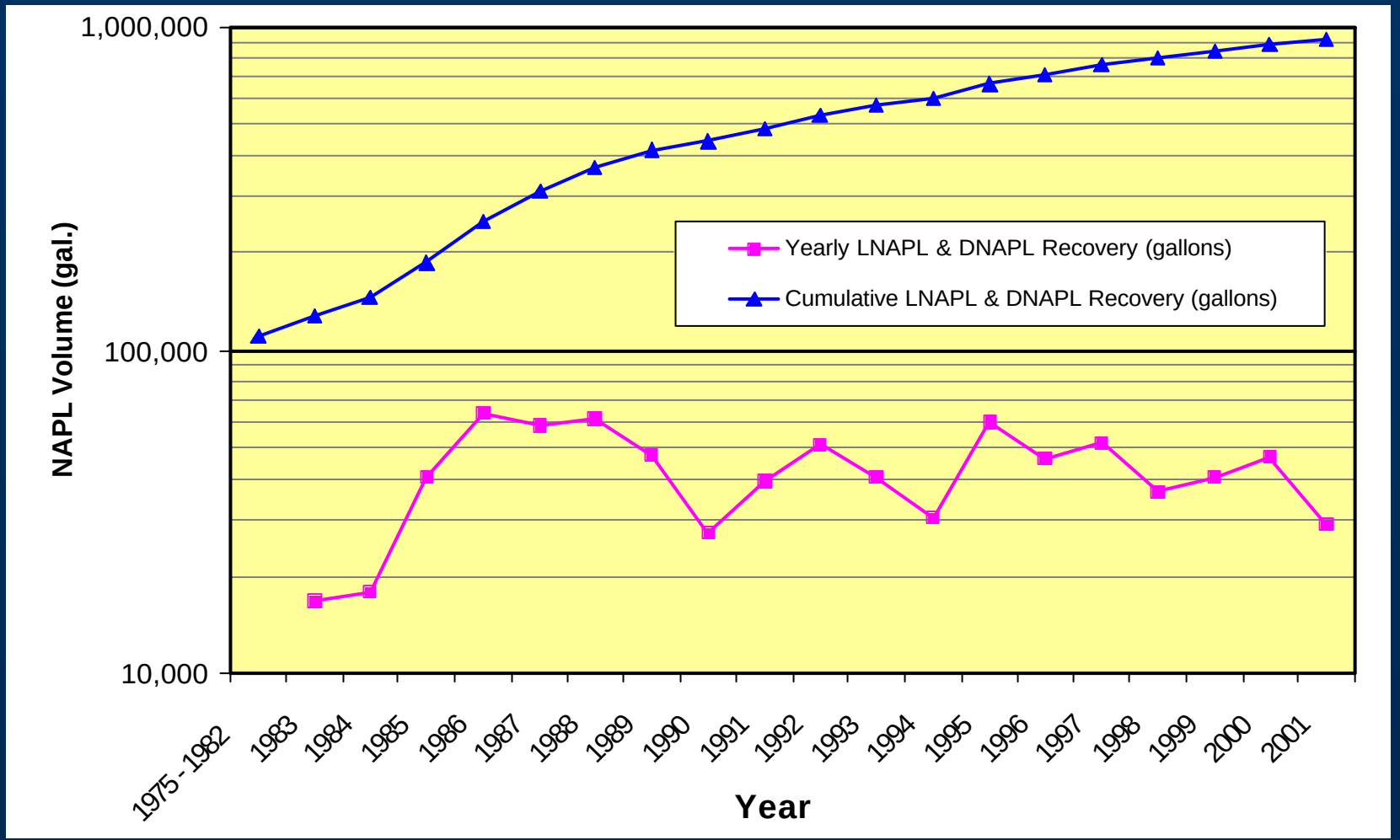


NAPL Performance Standards

- No Discharge of NAPL to Surface Water or Sediments Around or Under Barriers.
- Eliminate NAPL from Wells Near River and Lake Banks.
- Reduce NAPL in all Wells to Minimize Potential NAPL Migration to Surface Water and Help Achieve Groundwater Standards.
- Demonstrate that NAPL Near Buildings Doesn't Adversely Affect Indoor Air Quality.

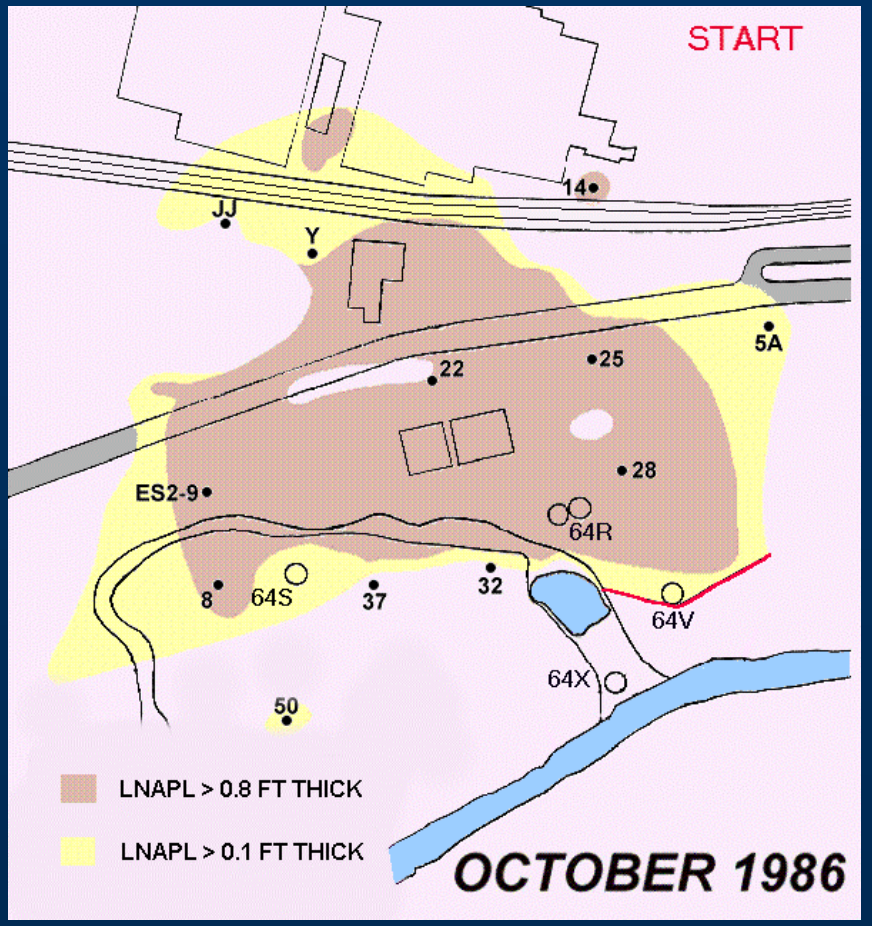
Sheetpile Containment Barrier & NAPL Recovery Well

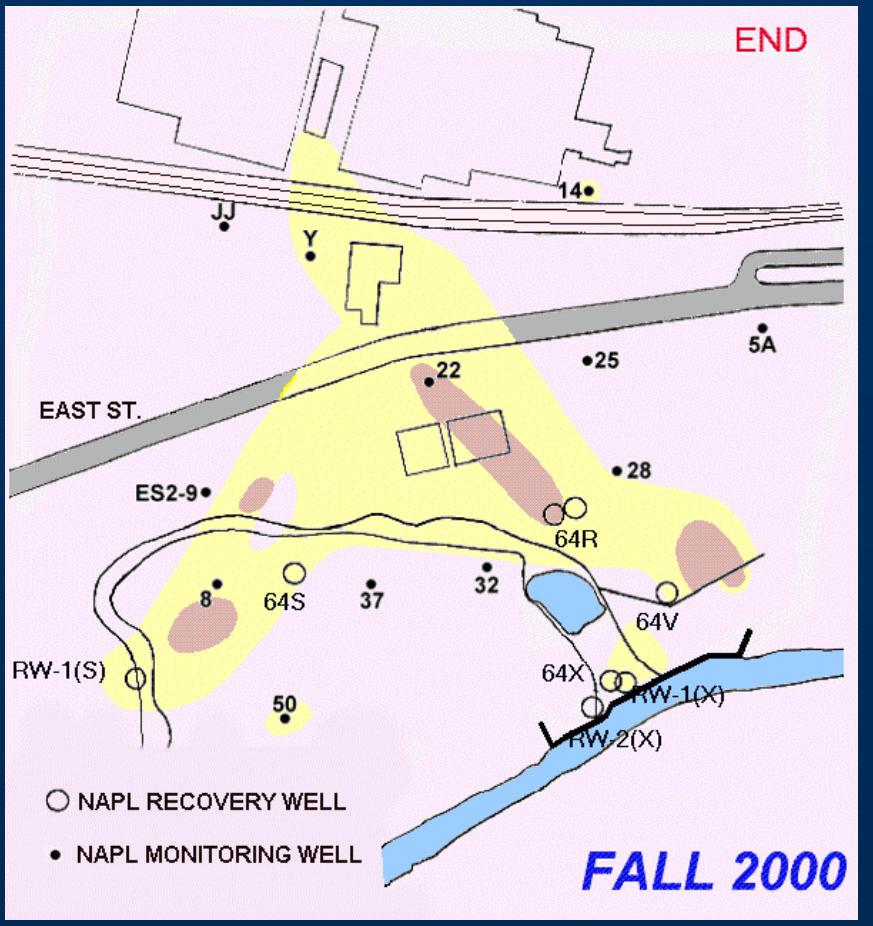
Summary of GMA-1 NAPL Recovery by GE

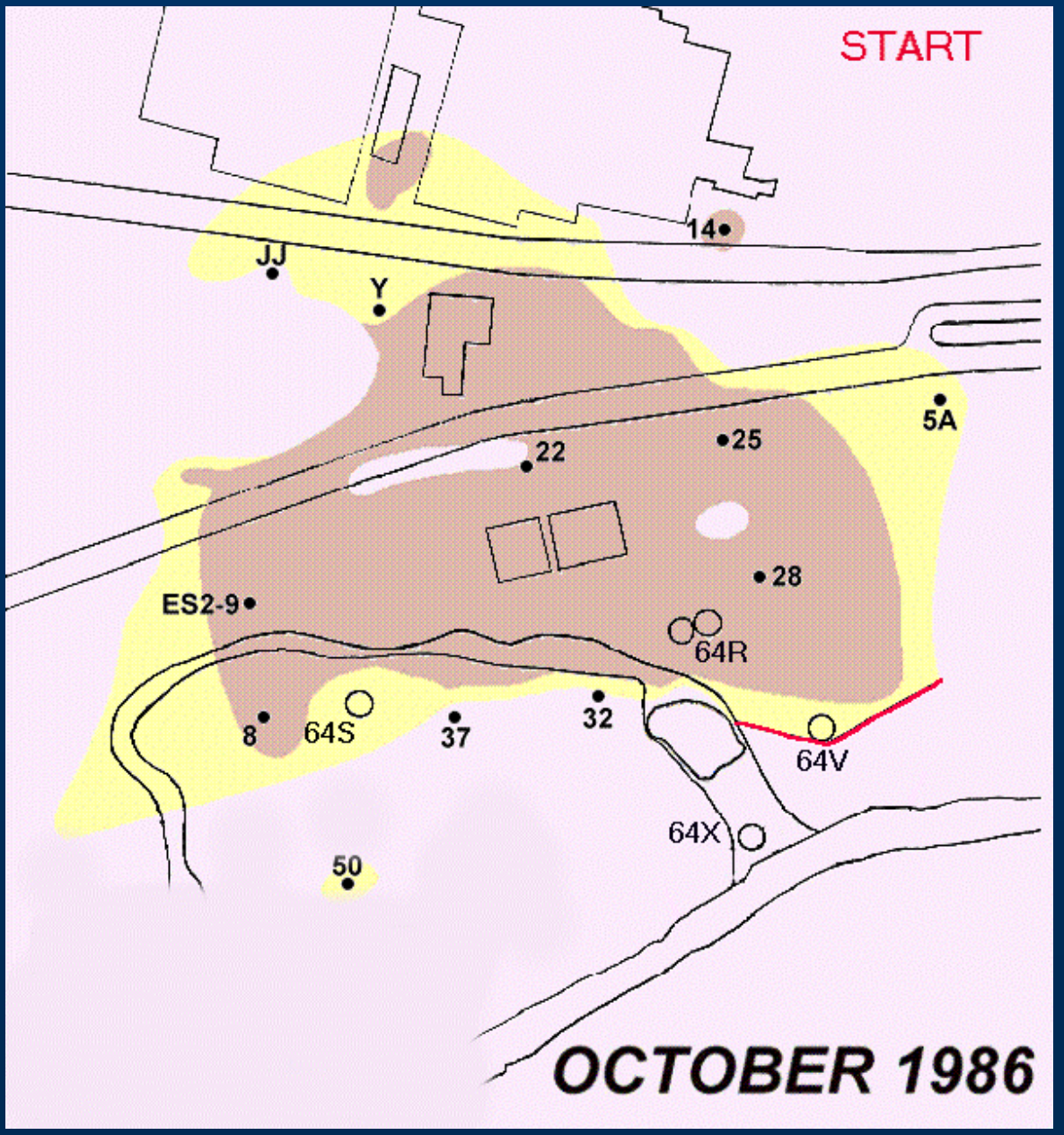


Groundwater Treatment Plant and Recovery Well 64-R

NAPL Remediation Animation, 1986 - 2000



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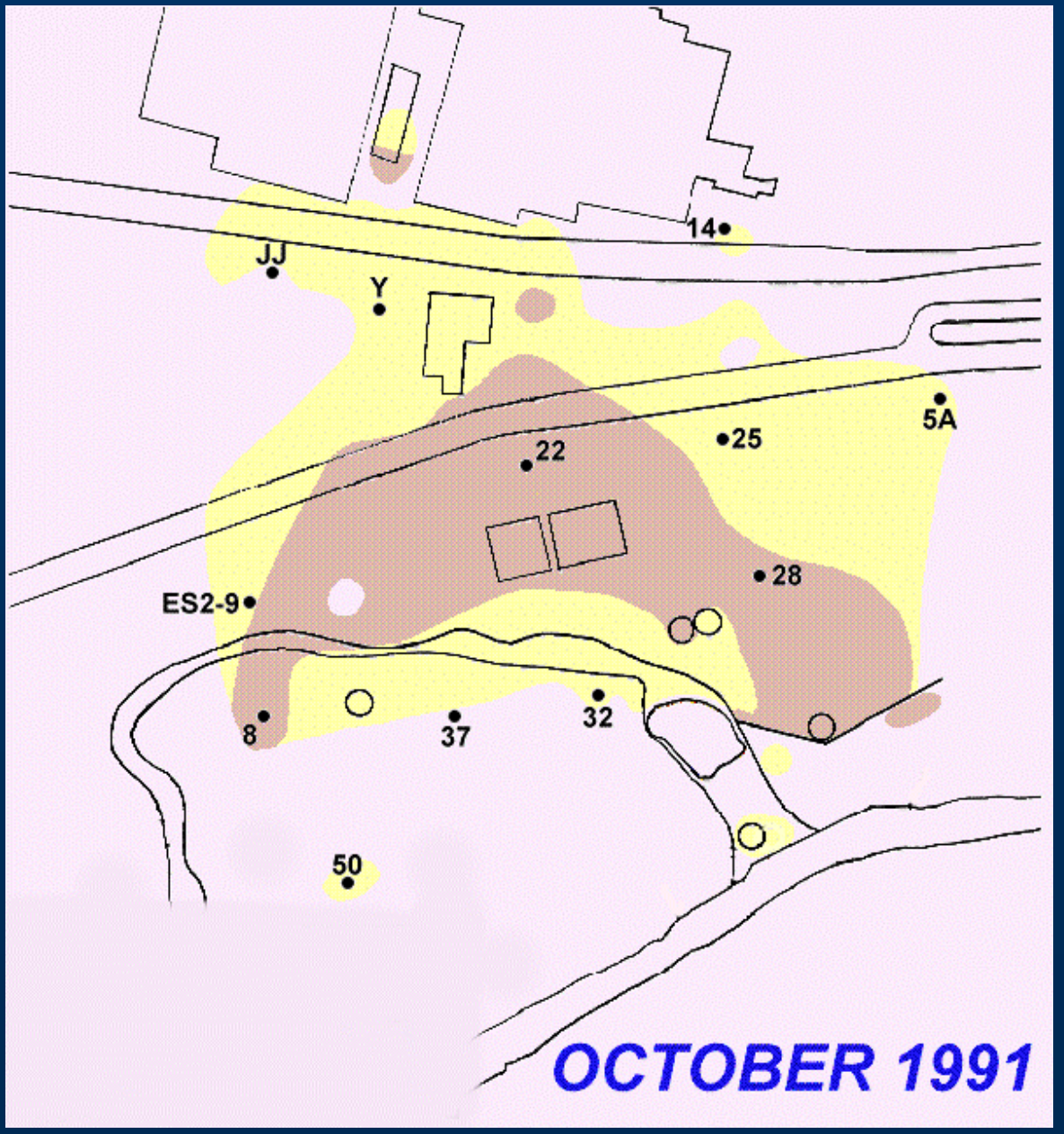
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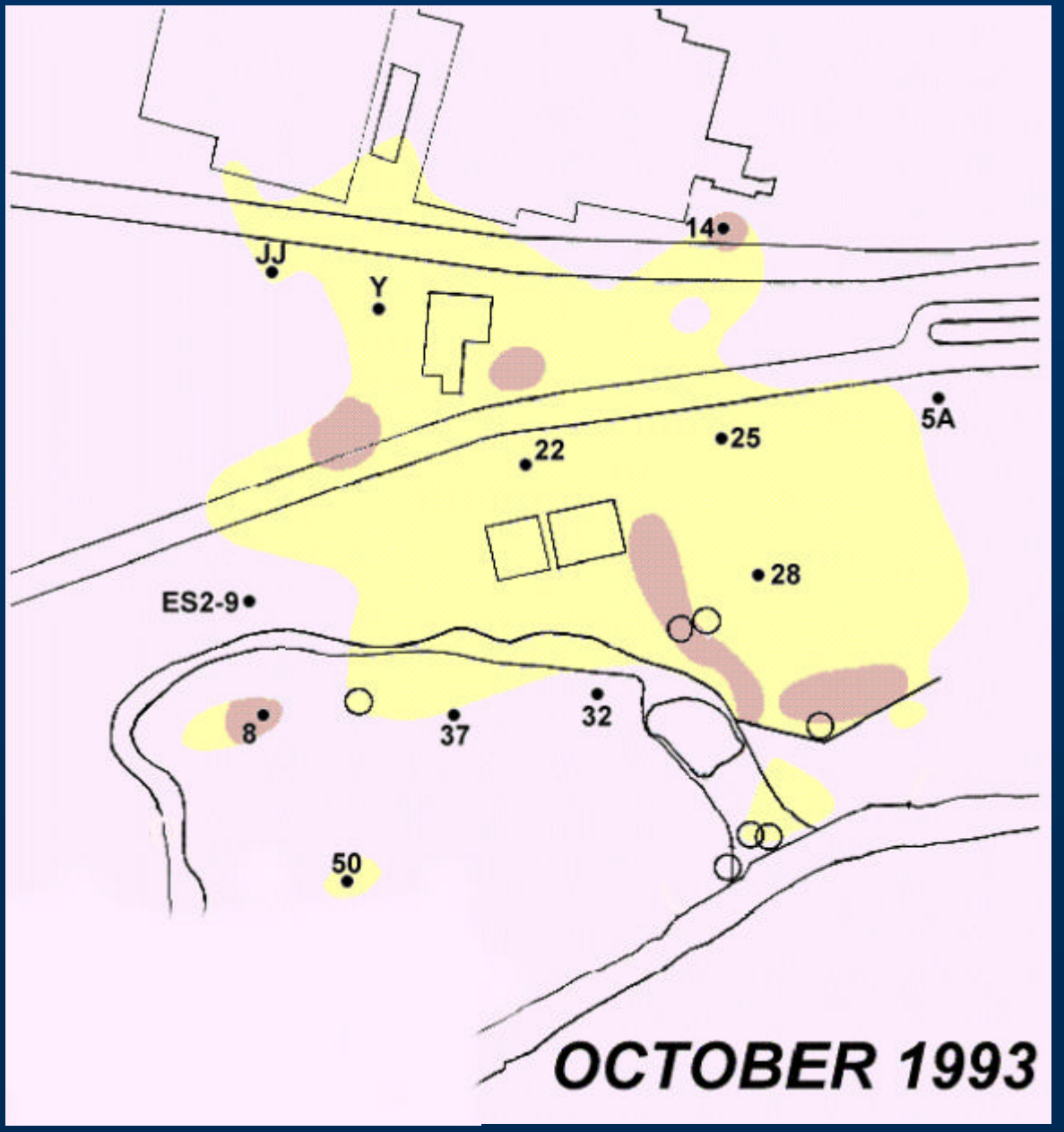
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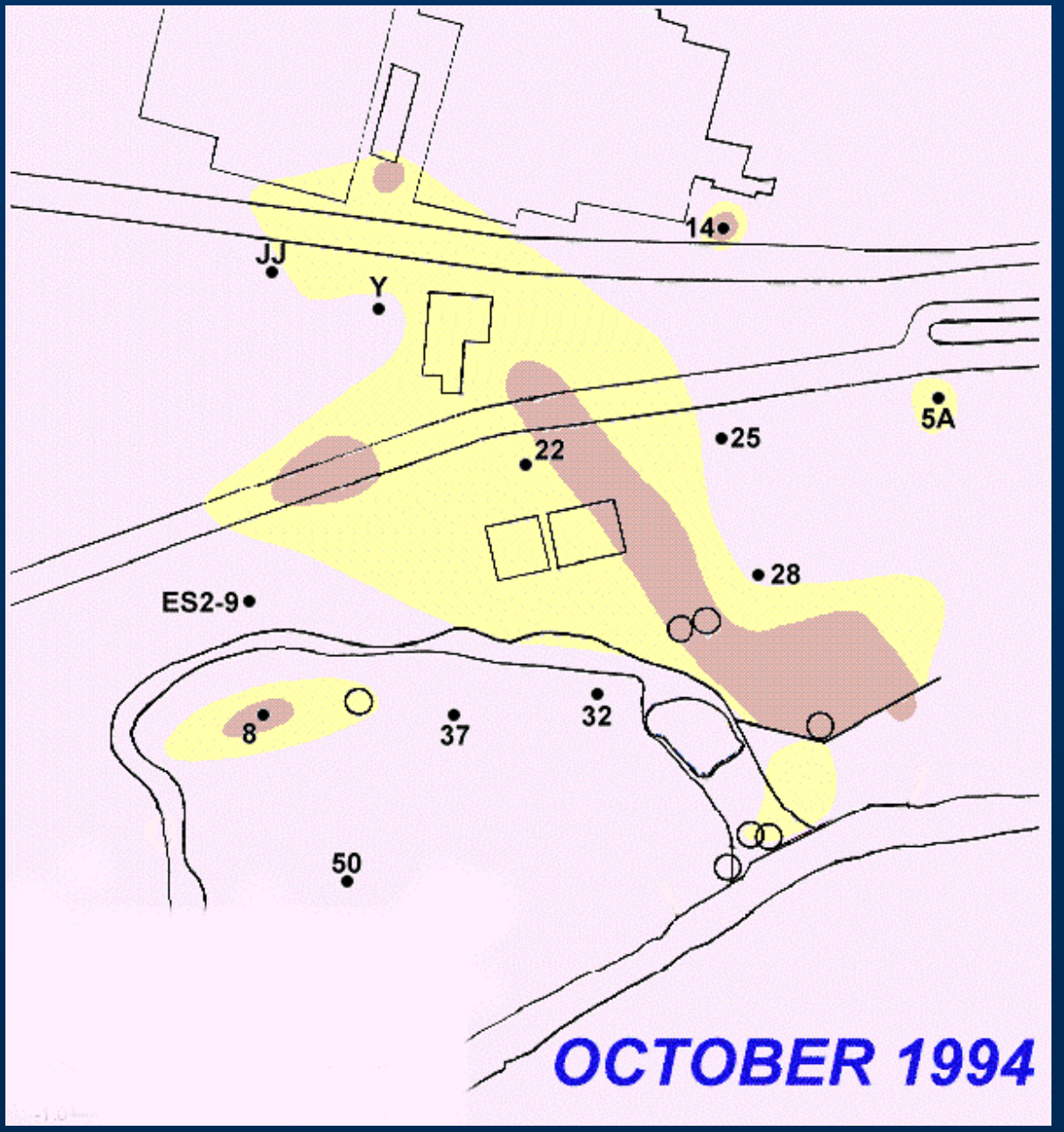
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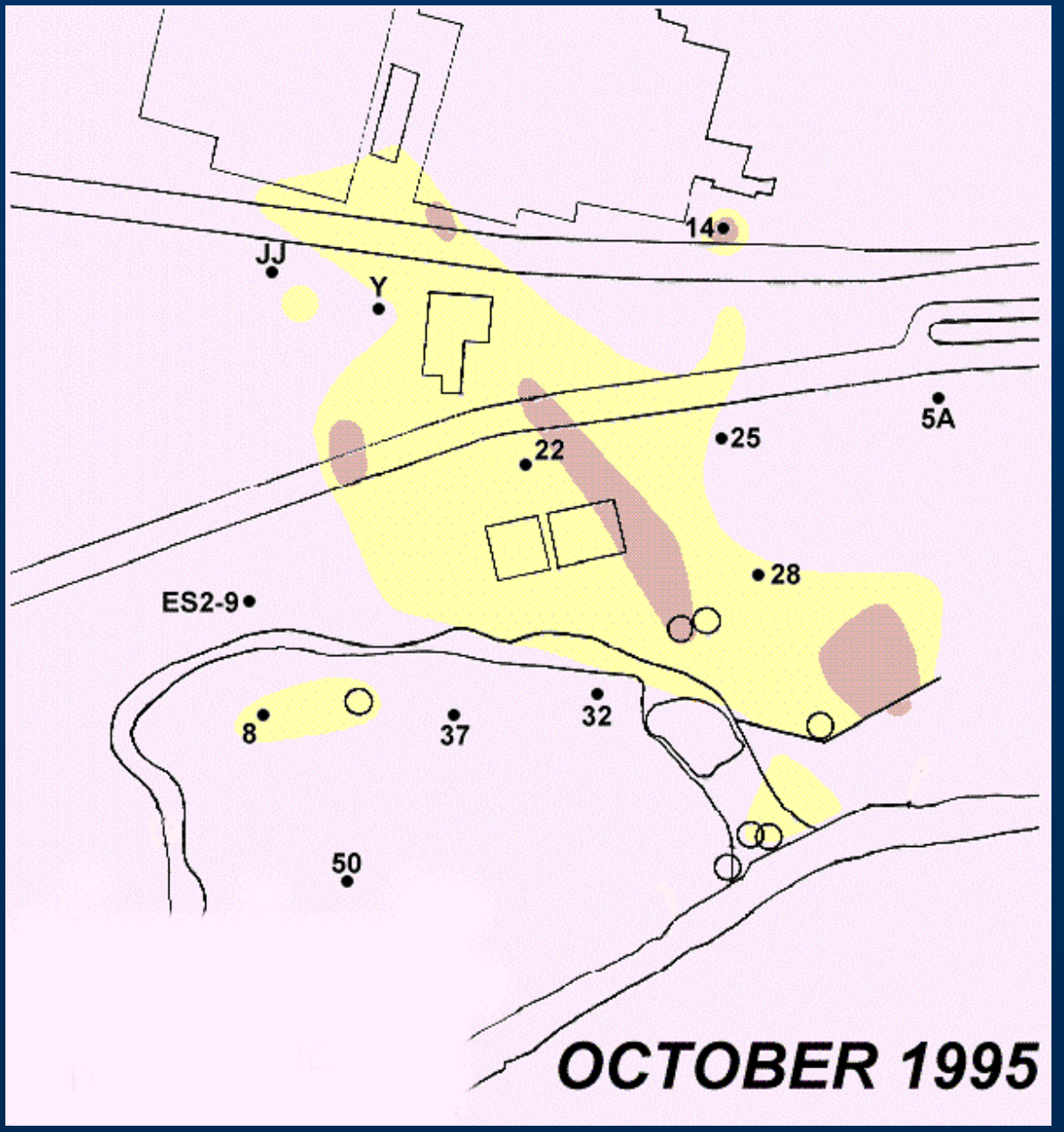
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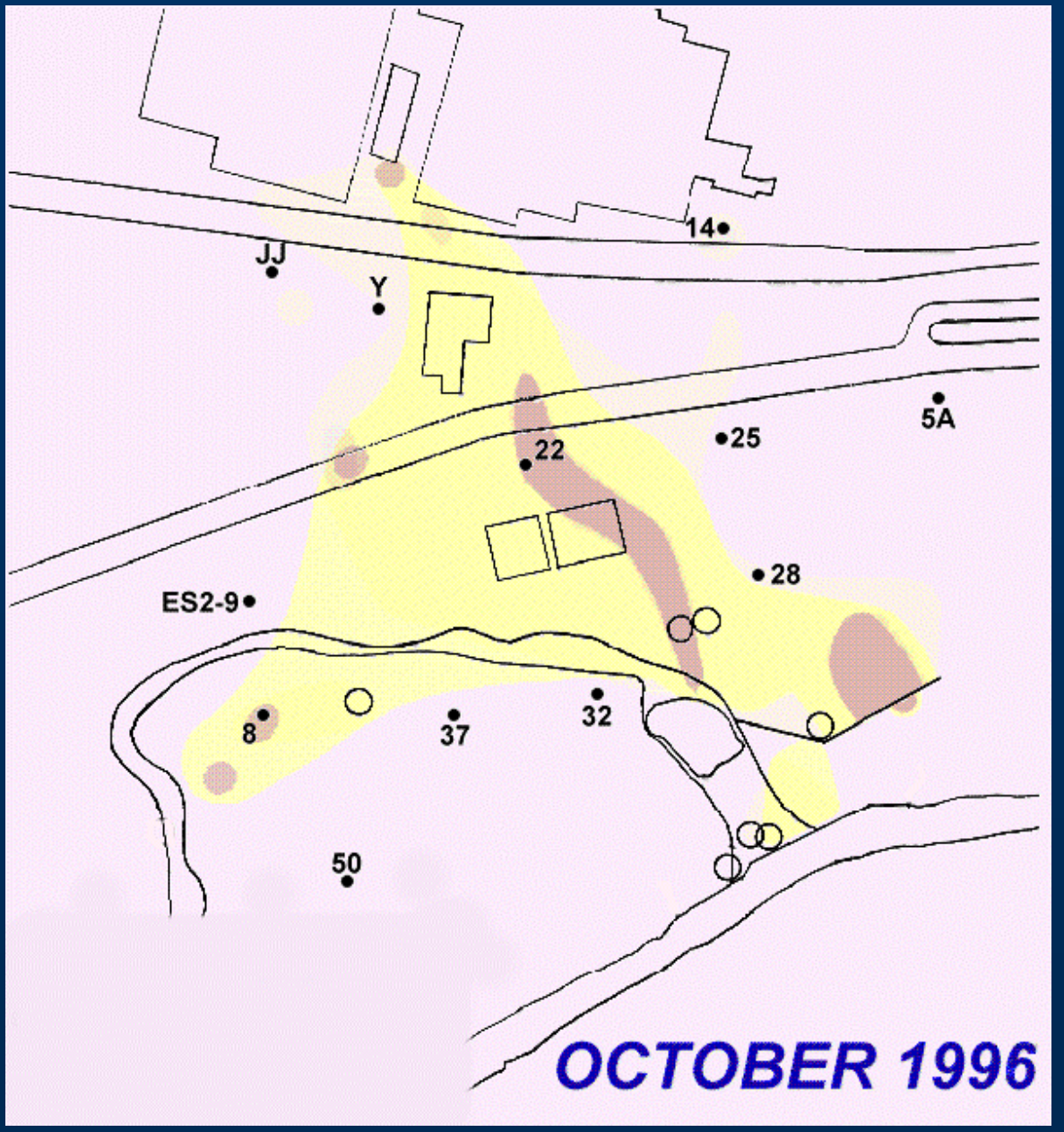
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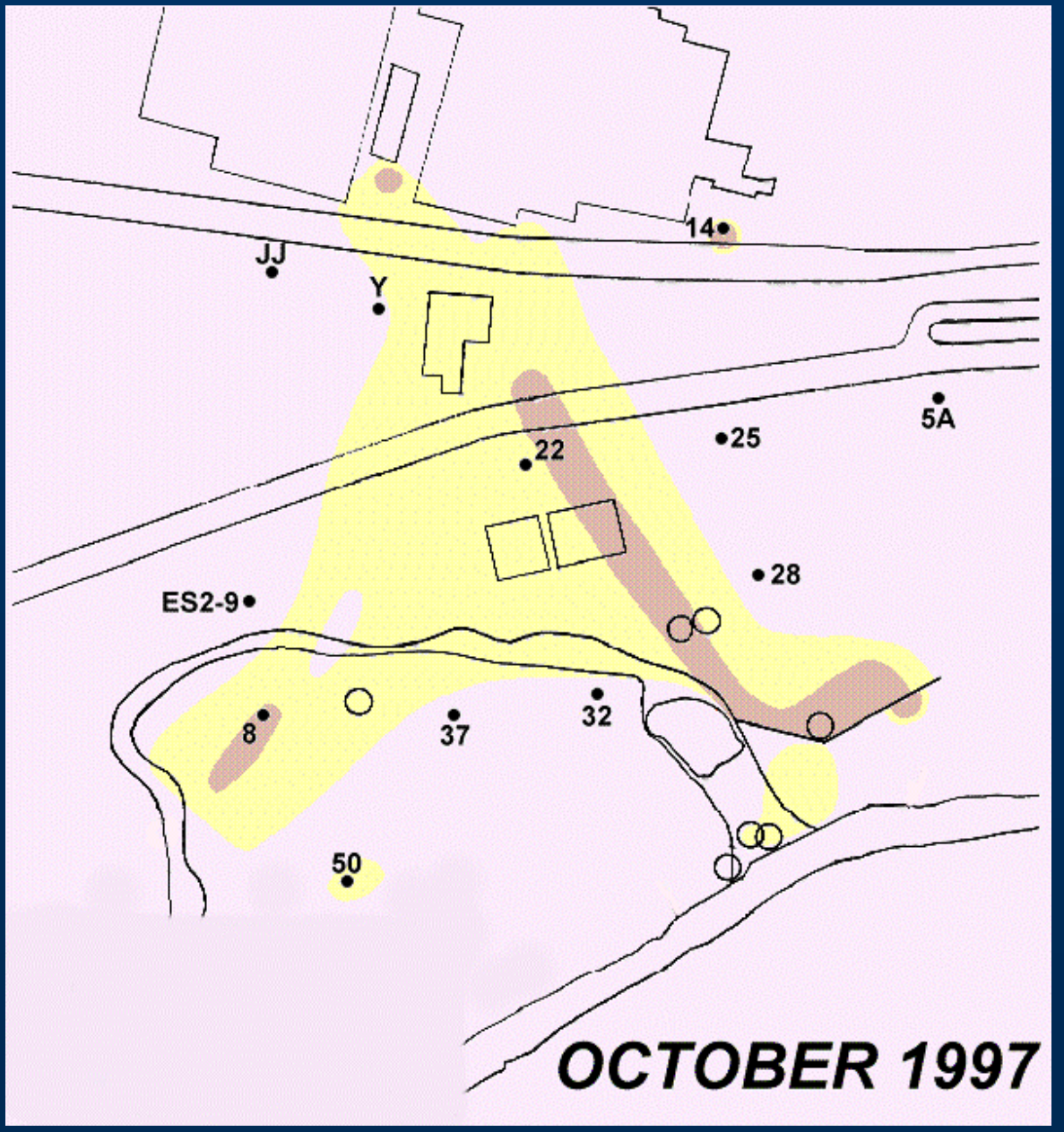
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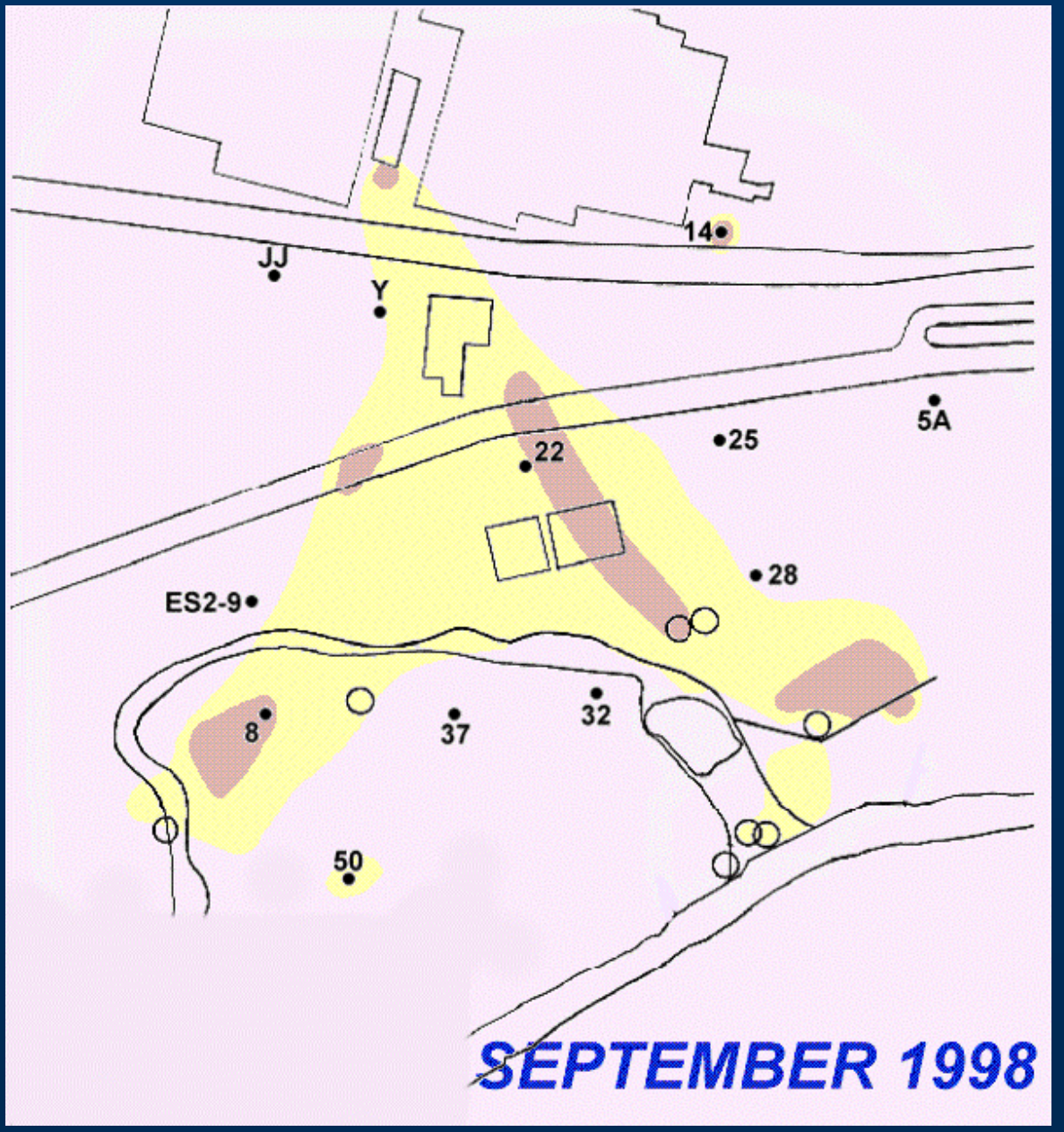
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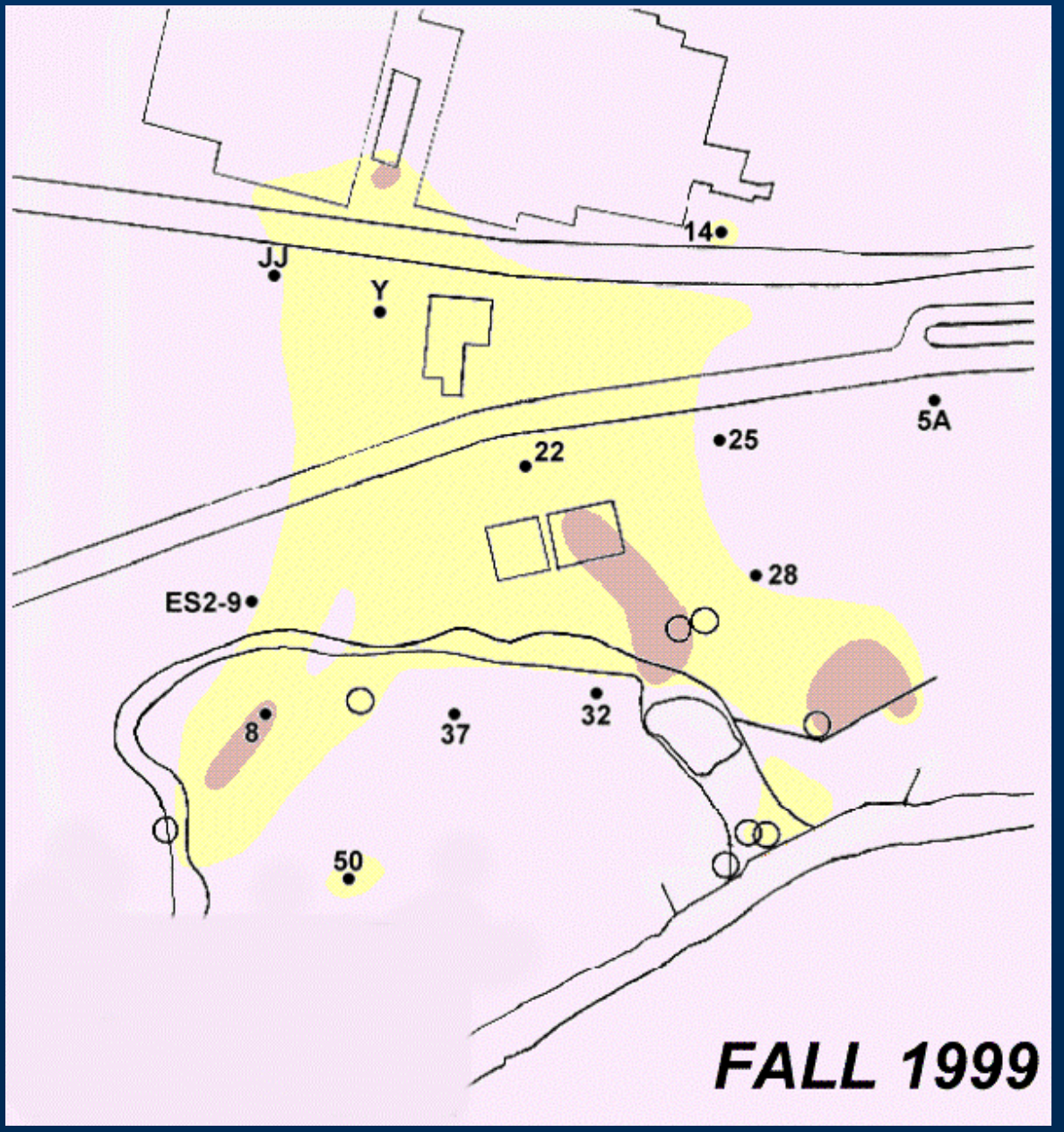
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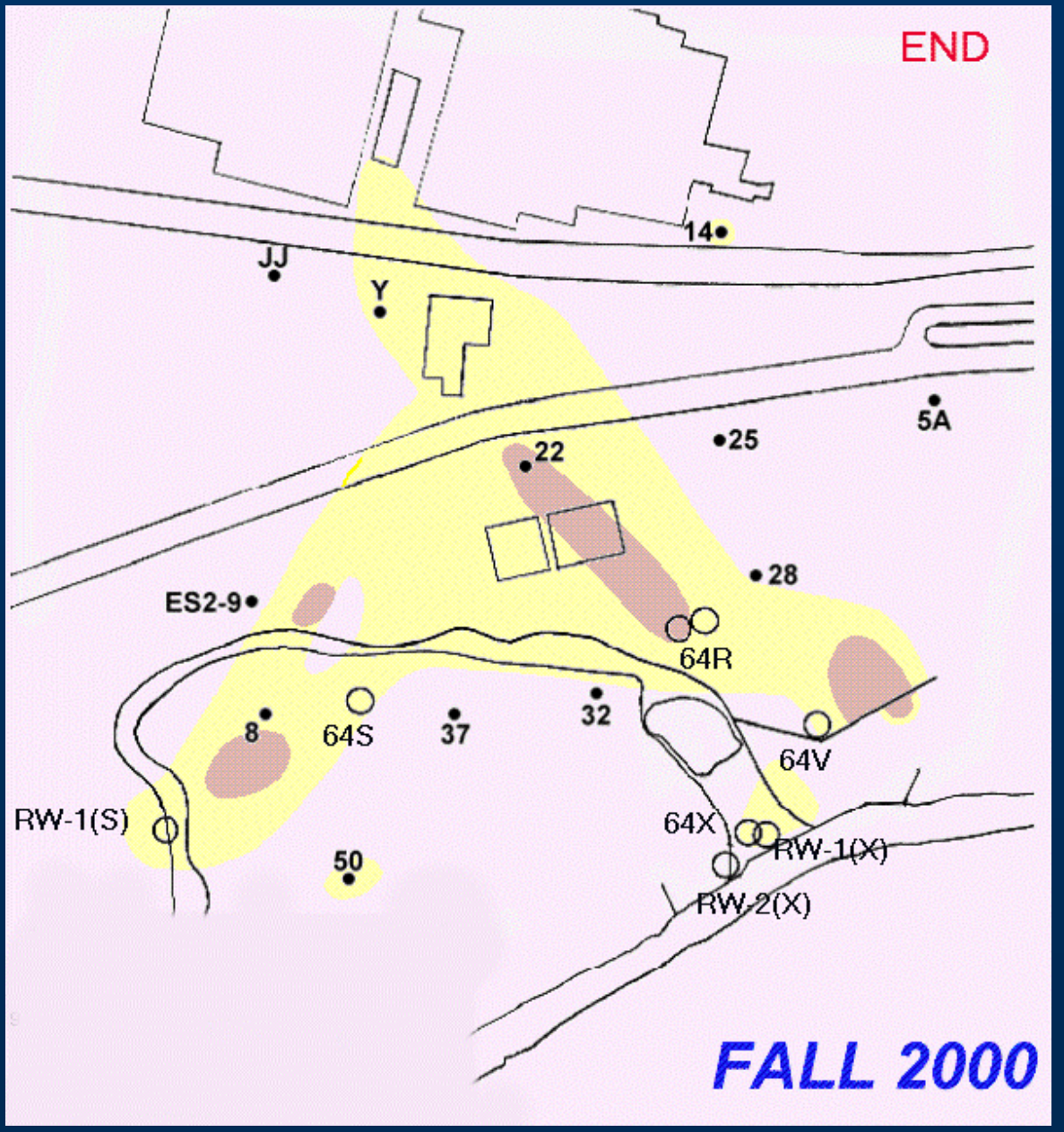
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64X
RW-1(X)
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RW-2(X)
FALL 2000

Groundwater Quality Standards

Massachusetts Contingency Plan (MCP)

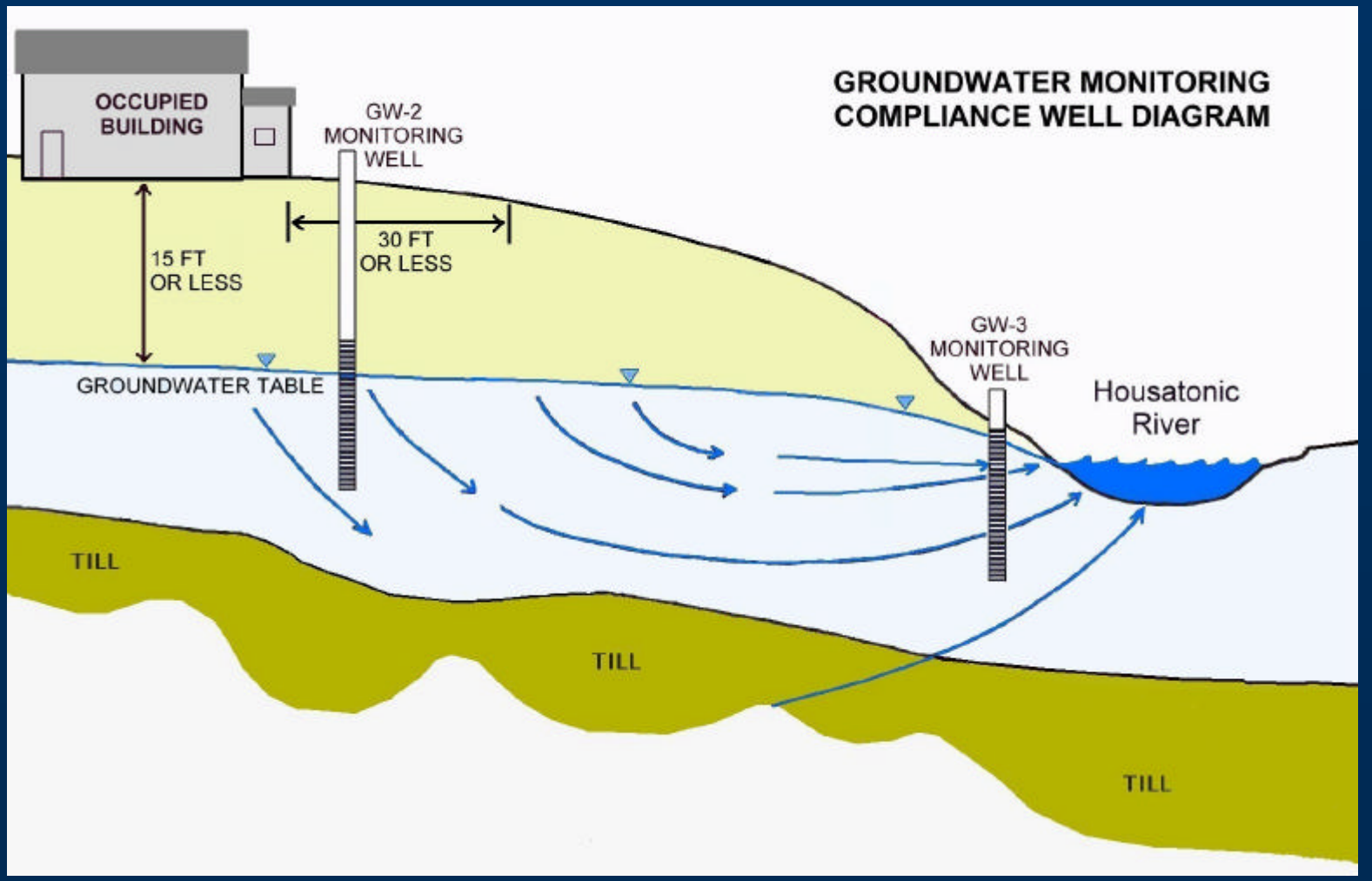
- MCP GW-2 Standards – Do not Exceed GW-2 Concentrations in Compliance Wells Near Buildings to Prevent Adverse Effects to Indoor Air Quality.

- MCP GW-3 Standards – Do not Exceed GW-3 Concentrations in Monitoring Wells to Protect Surface Water from Contaminated Groundwater Discharge.

MCP Groundwater Quality Standards - Example Table

Analyte	GW-2 Standard (ppm)	GW-3 Standard (ppm)
Total PCBs	Not Applicable	0.0003
Chlorobenzene	1	0.5
1,2,4-Trichlorobenzene	10	0.5
Trichloroethene (TCE)	0.3	20
Naphthalene	6	6

GW-2 & GW-3 Compliance Wells



Groundwater Monitoring Well Installation & Sampling

Groundwater Monitoring Program

Baseline Groundwater Monitoring Program

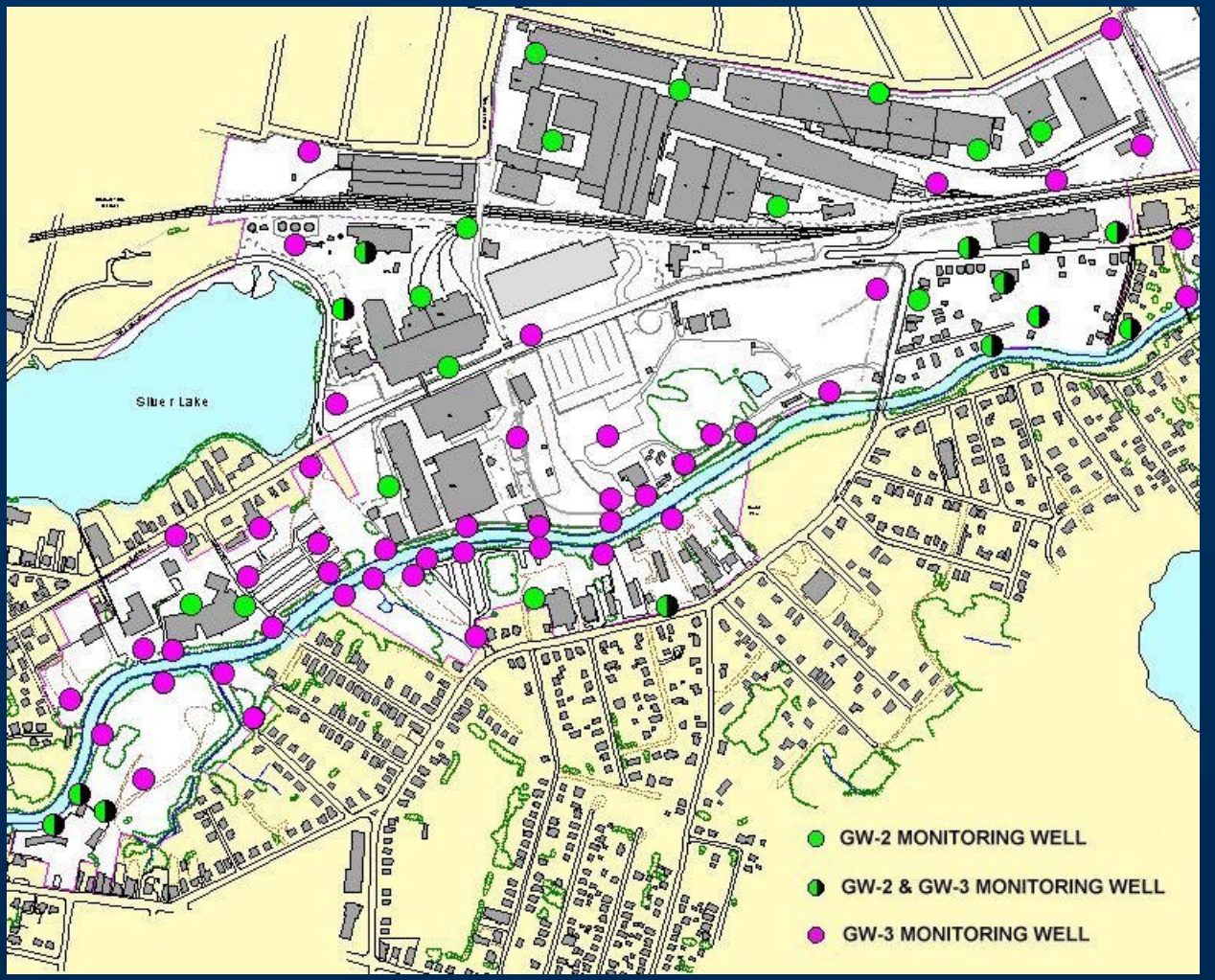
- Designed to Establish Current Conditions
- Quarterly Water Level Monitoring
- Semi-annual Groundwater Quality Sampling for Two Years

Long-Term Groundwater Monitoring Program

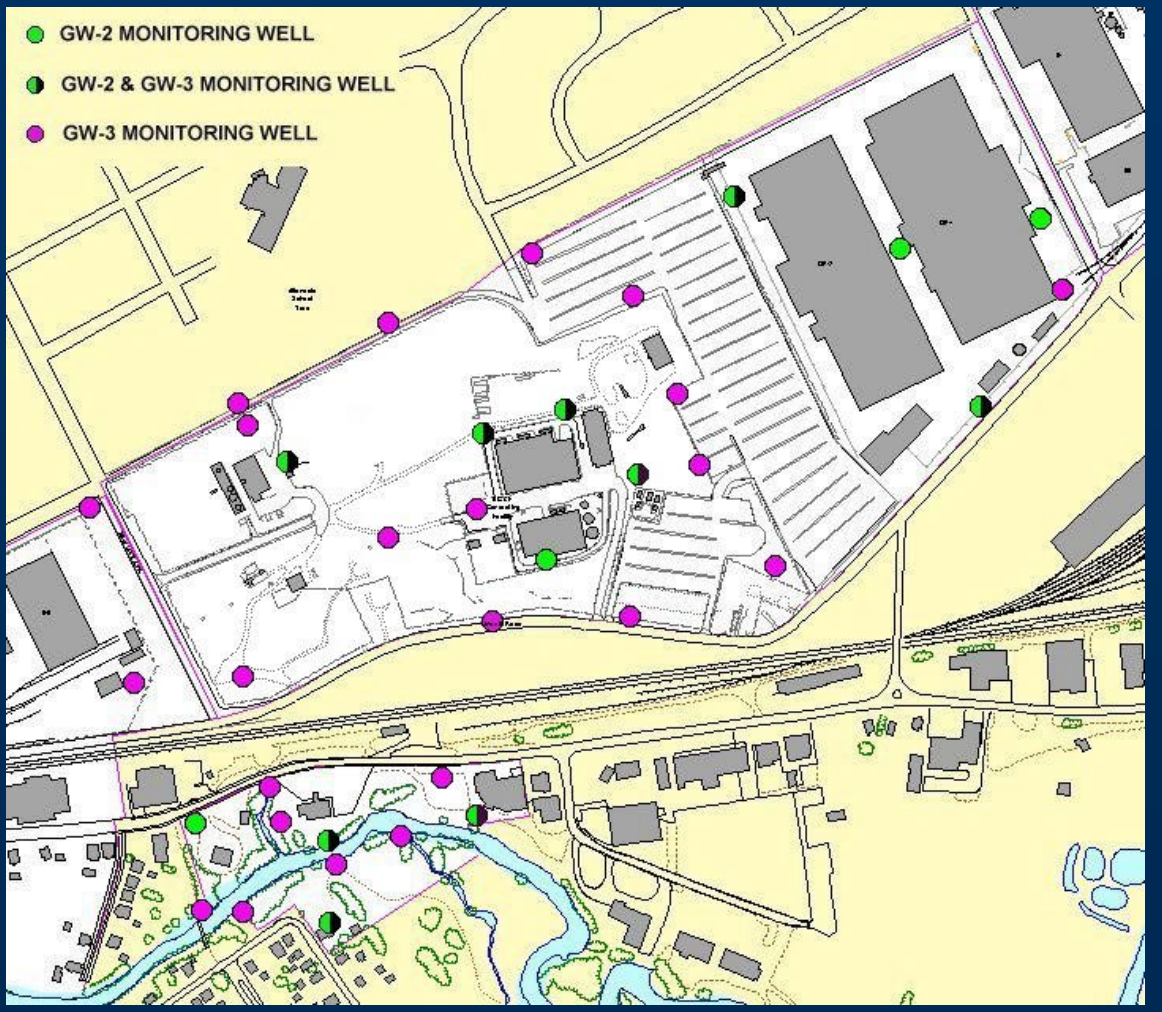
- Designed to Verify Attainment of Standards Over Time
- Program Specifics to be Determined After Baseline Program is Completed
- Monitoring/Sampling to be Conducted at Intervals of No More Than 2 Years.

Groundwater Sampling/Testing Team

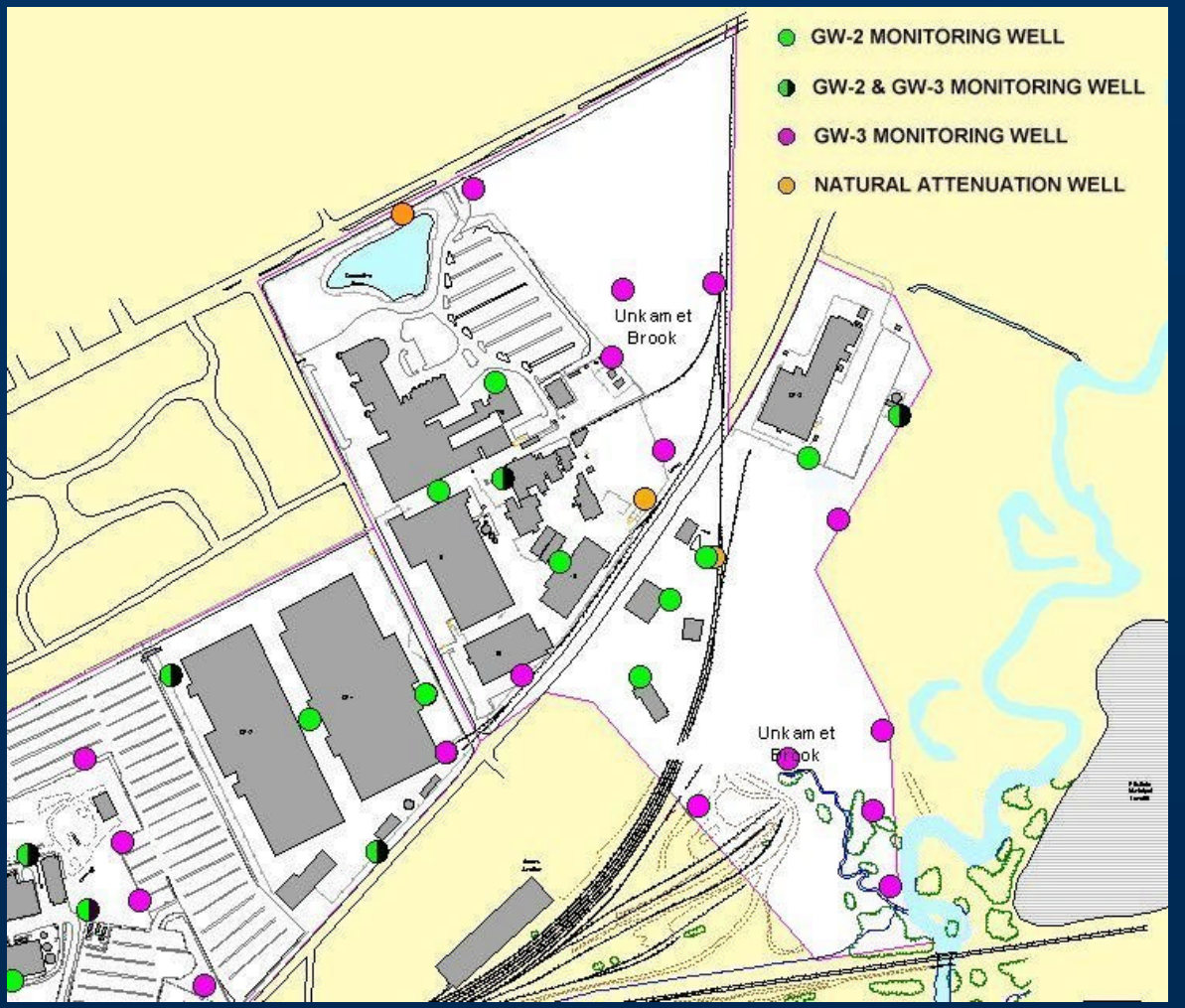
GMA-1 & GMA-5 Compliance Wells



GMA-2 & GMA-4 Compliance Wells



GMA-3 Compliance Wells



Overview of NAPL and Groundwater Programs